



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory
NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

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Job No.: CTCE/BBMP/W.No.06/TBMK/SDBC/Bitumen/2014-15

18.09.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AS PER IS2386 & IRC:SP:11-1984

CLIENT	Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP,
AGENCY	Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
NAME OF THE WORK	Improvements to Road and Drains at Chowrappa Layout in Ward No.06, BBMP, Bangalore.
REFERENCE	AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
SAMPLE I/D	Road and Drains at Chowrappa Layout in Ward No.06
DATE OF TESTING	18.09.2014



BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	476	475.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24	24.50
7. Bitumen content in %	4.80	4.90
8. Average	4.85	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	24.52	5.15	5.15	94.85	90-100
4.75	243.5	51.16	56.31	43.69	35-51
2.36	55.36	11.63	67.94	32.06	24-39
1.18	49.52	10.40	78.34	21.66	15-30
0.3	47.85	10.05	88.39	11.61	9-19
0.075	31.62	6.64	95.04	4.96	3-8

SIEVE SIZE	Trail 2				JOEMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	25.97	5.19	5.19	94.81	90-100
4.75	242.5	48.50	53.69	46.31	35-51
2.36	88.62	17.72	71.42	28.58	24-39
1.18	54.32	10.86	82.28	17.72	15-30
0.3	34.87	6.97	89.26	10.74	9-19
0.075	26.18	5.24	94.49	5.51	3-8

Note:

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08.09.2014

GRADATION FOR WMM MORTH TABLE-400-11

Client : Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency : Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
Name of Work : Improvements to Road and Drains at Chowrappa Layout in Ward No.06, BBMP, Bangalore.
Reference : AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
Date of Testing : 08.09.2014
Material : WMM
Sample Location : WMM Mix Plant **Oven Dry Wt (gm): 26300**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	985	985	3.7	96.3	95-100
22.4	6455	7440	28.3	71.7	60-80
11.2	6230	13670	52.0	48.0	40-60
4.75	4285	17955	68.3	31.7	25-40
2.36	3155	21110	80.3	19.7	15-30
0.600	2690	23800	90.5	9.5	8-22
0.075	2175	25975	98.8	1.2	0-8

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Job No.: CTCE/BBMP/W.No.06/TBMK/WMM/AIV/2014-15

08.09.2014



Aggregate Impact Value

IS: 2386 Part IV

Customer	Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drains at Chowrappa Layout in Ward No. 06, BBMP, Bangalore.
Reference	AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	08.09.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	84	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines	21.88	22.28	
	$100 * (W_2/W_1) \%$			22.08

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/TBMK/WMM/S-T/2014-15

08.09.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
Name of Work	Improvements to Roads and Drains at Chowrappa Layout in Ward No. 06, BBMP, Bangalore.
Reference	AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	08.09.2014



Result : Flakiness Index = 11.21%

Elongation Index = 13.53%

Result : Combined Flakiness & Elongation index 24.74%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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18.09.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drains at Chowrappa Layout in Ward No. 06, BBMP, Bangalore.
Reference	AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.09.2014



Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	384	21.46
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	80	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines $100 * (W_2 / W_1) \%$	21.05	21.88	

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.06/TBMK/SDBC/Shape_T/2014-15

18.09.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
Name of Work	Improvements to Roads and Drains at Chowrappa Layout in Ward No. 06, BBMP, Bangalore.
Reference	AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.09.2014



Result : Flakiness Index = **11.36%**

Elongation Index = **13.48%**

Result : Combined Flakiness & Elongation index

24.84%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.06/TBMK/SDBC/Stripping/2014-15

18.09.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
Name of the work	Improvements to Roads and Drains at Chowrappa Layout in Ward No. 06, BBMP, Bangalore.
Reference	AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.09.2014



Type of binder : 60/70
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.5	2.67	97.33
2	2.7		
3	2.8		



Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.06/TBMK/Sp_Wa/2014-15

18.09.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	Asst. Executive Engineer, Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	Mr. T.B. Mahesh Kumar, Contractor, Bangalore.
Name of the Work	Improvements to Roads and Drains at Chowrappa Layout in Ward No. 06, BBMP, Bangalore.
Reference	AEE/BTP/WO/64/2014-15 Dated: 04.09.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	18.09.2014



Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2012	2013	2015	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1257	1258	1260	
4	Weight of saturated surface dry aggregate in air	W_3 g	2010	2012	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s)$ g	753	754	755	
6	Weight of oven dried aggregate	W_4 g	1999	2002	2003	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.655	2.655	2.653	2.654
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.694	2.691	2.696	2.694
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.55%	0.50%	0.60%	0.55%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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